

MTP 15HD RS Series

High Resolution Video and Serial Link
MTP Transmitters and Receivers



Extron® Electronics
INTERFACING, SWITCHING AND CONTROL

Safety Instructions • English



This symbol is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.



This symbol is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.

Caution

Read Instructions • Read and understand all safety and operating instructions before using the equipment.

Retain Instructions • The safety instructions should be kept for future reference.

Follow Warnings • Follow all warnings and instructions marked on the equipment or in the user information.

Avoid Attachments • Do not use tools or attachments that are not recommended by the equipment manufacturer because they may be hazardous.

Consignes de Sécurité • Français



Ce symbole sert à avertir l'utilisateur que la documentation fournie avec le matériel contient des instructions importantes concernant l'exploitation et la maintenance (réparation).



Ce symbole sert à avertir l'utilisateur de la présence dans le boîtier de l'appareil de tensions dangereuses non isolées posant des risques d'électrocution.

Attention

Lire les instructions • Prendre connaissance de toutes les consignes de sécurité et d'exploitation avant d'utiliser le matériel.

Conservier les instructions • Ranger les consignes de sécurité afin de pouvoir les consulter à l'avenir.

Respecter les avertissements • Observer tous les avertissements et consignes marqués sur le matériel ou présentés dans la documentation utilisateur.

Eviter les pièces de fixation • Ne pas utiliser de pièces de fixation ni d'outils non recommandés par le fabricant du matériel car cela risquerait de poser certains dangers.

Sicherheitsanleitungen • Deutsch



Dieses Symbol soll dem Benutzer in der im Lieferumfang enthaltenen Dokumentation besonders wichtige Hinweise zur Bedienung und Wartung (Instandhaltung) geben.



Dieses Symbol soll den Benutzer darauf aufmerksam machen, daß im Inneren des Gehäuses dieses Produktes gefährliche Spannungen, die nicht isoliert sind und die einen elektrischen Schock verursachen können, herrschen.

Achtung

Lesen der Anleitungen • Bevor Sie das Gerät zum ersten Mal verwenden, sollten Sie alle Sicherheits- und Bedienungsanleitungen genau durchlesen und verstehen.

Aufbewahren der Anleitungen • Die Hinweise zur elektrischen Sicherheit des Produktes sollten Sie aufbewahren, damit Sie im Bedarfsfall darauf zurückgreifen können.

Befolgen der Warnhinweise • Befolgen Sie alle Warnhinweise und Anleitungen auf dem Gerät oder in der Benutzerdokumentation.

Keine Zusatzgeräte • Verwenden Sie keine Werkzeuge oder Zusatzgeräte, die nicht ausdrücklich vom Hersteller empfohlen wurden, da diese eine Gefahrenquelle darstellen können.

Instrucciones de seguridad • Español



Este símbolo se utiliza para advertir al usuario sobre instrucciones importantes de operación y mantenimiento (o cambio de partes) que se desean destacar en el contenido de la documentación suministrada con los equipos.



Este símbolo se utiliza para advertir al usuario sobre la presencia de elementos con voltaje peligroso sin protección aislante, que puedan encontrarse dentro de la caja o alojamiento del producto, y que puedan representar riesgo de electrocución.

Precaución

Leer las instrucciones • Leer y analizar todas las instrucciones de operación y seguridad, antes de usar el equipo.

Conservar las instrucciones • Conservar las instrucciones de seguridad para futura consulta.

Obedecer las advertencias • Todas las advertencias e instrucciones marcadas en el equipo o en la documentación del usuario, deben ser obedecidas.

Evitar el uso de accesorios • No usar herramientas o accesorios que no sean específicamente recomendados por el fabricante, ya que podrían implicar riesgos.

安全须知 • 中文



这个符号提示用户该设备用户手册中有重要的操作和维护说明。



这个符号警告用户该设备机壳内有暴露的危险电压，有触电危险。

注意

阅读说明书 • 用户使用该设备前必须阅读并理解所有安全和使用说明。

保存说明书 • 用户应保存安全说明书以备将来使用。

遵守警告 • 用户应遵守产品和用户指南上的所有安全和操作说明。

避免追加 • 不要使用该产品的厂商没有推荐的工具或追加设备，以避免危险。

Warning

Power sources • This equipment should be operated only from the power source indicated on the product. This equipment is intended to be used with a main power system with a grounded (neutral) conductor. The third (grounding) pin is a safety feature, do not attempt to bypass or disable it.

Power disconnection • To remove power from the equipment safely, remove all power cords from the rear of the equipment, or the desktop power module (if detachable), or from the power source receptacle (wall plug).

Power cord protection • Power cords should be routed so that they are not likely to be stepped on or pinched by items placed upon or against them.

Servicing • Refer all servicing to qualified service personnel. There are no user-serviceable parts inside. To prevent the risk of shock, do not attempt to service this equipment yourself because opening or removing covers may expose you to dangerous voltage or other hazards.

Slots and openings • If the equipment has slots or holes in the enclosure, these are provided to prevent overheating of sensitive components inside. These openings must never be blocked by other objects.

Lithium battery • There is a danger of explosion if battery is incorrectly replaced. Replace it only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Avertissement

Alimentations • Ne faire fonctionner ce matériel qu'avec la source d'alimentation indiquée sur l'appareil. Ce matériel doit être utilisé avec une alimentation principale comportant un fil de terre (neutre). Le troisième contact (de mise à la terre) constitue un dispositif de sécurité : n'essayez pas de la contourner ni de la désactiver.

Déconnexion de l'alimentation • Pour mettre le matériel hors tension sans danger, déconnectez tous les cordons d'alimentation de l'arrière de l'appareil ou du module d'alimentation de bureau (s'il est amovible) ou encore de la prise secteur.

Protection du cordon d'alimentation • Acheminer les cordons d'alimentation de manière à ce que personne ne risque de marcher dessus et à ce qu'ils ne soient pas écrasés ou pincés par des objets.

Réparation-maintenance • Faire exécuter toutes les interventions de réparation-maintenance par un technicien qualifié. Aucun des éléments internes ne peut être réparé par l'utilisateur. Afin d'éviter tout danger d'électrocution, l'utilisateur ne doit pas essayer de procéder lui-même à ces opérations car l'ouverture ou le retrait des couvercles risquent de l'exposer à de hautes tensions et autres dangers.

Fentes et orifices • Si le boîtier de l'appareil comporte des fentes ou des orifices, ceux-ci servent à empêcher les composants internes sensibles de surchauffer. Ces ouvertures ne doivent jamais être bloquées par des objets.

Lithium Batterie • Il a danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

Vorsicht

Stromquellen • Dieses Gerät sollte nur über die auf dem Produkt angegebene Stromquelle betrieben werden.

Dieses Gerät wurde für eine Verwendung mit einer Hauptstromleitung mit einem geerdeten (neutralen) Leiter konzipiert. Der dritte Kontakt ist für einen Erdschluss, und stellt eine Sicherheitsfunktion dar. Diese sollte nicht umgangen oder außer Betrieb gesetzt werden.

Stromunterbrechung • Um das Gerät auf sichere Weise vom Netz zu trennen, sollten Sie alle Netzkabel aus der Rückseite des Gerätes, aus der externen Stromversorgung (falls dies möglich ist) oder aus der Wandsteckdose ziehen.

Schutz des Netzkabels • Netzkabel sollten stets so verlegt werden, daß sie nicht im Weg liegen und niemand darauf treten kann oder Objekte darauf- oder unmittelbar dagegengestellt werden können.

Wartung • Alle Wartungsmaßnahmen sollten nur von qualifiziertem Servicepersonal durchgeführt werden. Die internen Komponenten des Gerätes sind wartungsfrei. Zur Vermeidung eines elektrischen Schocks versuchen Sie in keinem Fall, dieses Gerät selbst öffnen, da beim Entfernen der Abdeckungen die Gefahr eines elektrischen Schlags und/oder andere Gefahren bestehen.

Schlitze und Öffnungen • Wenn das Gerät Schlitze oder Löcher im Gehäuse aufweist, dienen diese zur Vermeidung einer Überhitzung der empfindlichen Teile im Inneren. Diese Öffnungen dürfen niemals von anderen Objekten blockiert werden.

Lithium-Batterie • Explosionsgefahr, falls die Batterie nicht richtig ersetzt wird. Ersetzen Sie verbrauchte Batterien nur durch den gleichen oder einen vergleichbaren Batterietyp, der auch vom Hersteller empfohlen wird. Entsorgen Sie verbrauchte Batterien bitte gemäß den Herstelleranweisungen.

Advertencia

Alimentación eléctrica • Este equipo debe conectarse únicamente a la fuente/tipo de alimentación eléctrica indicada en el mismo. La alimentación eléctrica de este equipo debe provenir de un sistema de distribución general con conductor neutro a tierra. La tercera pata (puesta a tierra) es una medida de seguridad, no puentearla ni eliminarla.

Desconexión de alimentación eléctrica • Para desconectar con seguridad la acometida de alimentación eléctrica al equipo, desenchufar todos los cables de alimentación en el panel trasero del equipo, o desenchufar el módulo de alimentación (si fuera independiente), o desenchufar el cable del receptáculo de la pared.

Protección del cables de alimentación • Los cables de alimentación eléctrica se deben instalar en lugares donde no sean pisados ni apretados por objetos que se puedan apoyar sobre ellos.

Reparaciones/mantenimiento • Solicitar siempre los servicios técnicos de personal calificado. En el interior no hay partes a las que el usuario deba acceder. Para evitar riesgo de electrocución, no intentar personalmente la reparación/mantenimiento de este equipo, ya que al abrir o extraer las tapas puede quedar expuesto a voltajes peligrosos u otros riesgos.

Ranuras y aberturas • Si el equipo posee ranuras o orificios en su caja/alojamiento, es para evitar el sobrecalentamiento de componentes internos sensibles. Estas aberturas nunca se deben obstruir con otros objetos.

Batería de litio • Existe riesgo de explosión si esta batería se coloca en la posición incorrecta. Cambiar esta batería únicamente con el mismo tipo (o su equivalente) recomendado por el fabricante. Desachar las baterías usadas siguiendo las instrucciones del fabricante.

警告

电源 • 该设备只能使用产品上标明的电源。设备必须使用有地线的供电系统供电。第三条线（地线）是安全设施，不能不用或跳过。

拔掉电源 • 为安全地从设备拔掉电源，请拔掉所有设备后或桌面电源的电源线，或任何接到市电系统的电源线。

电源线保护 • 妥善布线，避免被踩踏，或重物挤压。

维护 • 所有维修必须由认证的维修人员进行。设备内部没有用户可以更换的零件。为避免出现触电危险不要自己试图打开设备盖子维修该设备。

通风孔 • 有些设备机壳上有通风槽或孔，它们是用来防止机内敏感元件过热。不要用任何东西挡住通风孔。

锂电池 • 不正确的更换电池会有爆炸的危险。必须使用与厂家推荐的相同或相近型号的电池。按照生产厂的建议处理废弃电池。

FCC Class A Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

The Class A limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

NOTE: This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to ensure compliance with FCC emissions limits.
For more information on safety guidelines, regulatory compliances, EMI/EMF compliance, accessibility, and related topics, [click here](#).

Conventions Used in this Guide

In this user guide, the following are used:

WARNING: A warning indicates a situation that has the potential to result in death or severe injury.

ATTENTION: Attention indicates a situation that may damage or destroy the product or associated equipment.

NOTE: A note draws attention to important information.

Specifications Availability

Product specifications are available on the Extron website, www.extron.com.

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Trademarks

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Introduction

This section gives an overview of the user guide. This section also describes the MTP 15HD RS Series of transmitters and receivers. Topics that are covered include:

- **About this Guide**
- **About the MTP Transmitters and Receivers**
- **Transmission Distance**

About this Guide

This guide contains installation, configuration, and operation information for Extron MTP transmitters and receivers that are compatible with:

- Extron Enhanced Skew-Free™ AV UTP cable
- Category (CAT) 5, 5e, and 6 shielded twisted pair (STP), unshielded twisted pair (UTP), or foil shielded twisted pair (FTP) cable.

This guide details the installation and operation of the following products:

- MTP T 15HD RS twisted pair (TP) transmitter
- MTP RL 15HD RS receiver with loop-through
- MTP RL 15HD RS SEQ receiver with loop-through and skew equalization

In this guide:

- The term "transmitter" refers specifically to the MTP T 15HD RS transmitter.
- The term "receiver" refers to either of the receiver models — the MTP RL 15HD RS or MTP RL 15HD RS SEQ.
- The term "SEQ receiver" refers specifically to the MTP RL 15HD RS SEQ receiver with skew equalization capabilities.

About the MTP Transmitters and Receivers

The Extron MTP T 15HD RS transmitter and MTP RL 15HD RS and MTP RL 15HD RS SEQ receivers are a system for long-distance distribution of VGA or other high resolution video and RS-232 serial communications.

The MTPs are a part of the Extron compact line of basic distribution amplifiers, switchers, transmitters, receivers, and associated video accessories.

High resolution video is sent to the MTP transmitter on a 15-pin HD connector. The transmitter passes RS-232 serial data or control signals on a 3.5 mm 3-pin captive screw connector. The transmitter converts the video and RS-232 signals to proprietary signals and outputs them to the compatible MTP receiver on an RJ-45 connector. The transmitter also makes the input video available for local use on a 15-pin HD connector.

The transmitted proprietary signal is sent to the receiver on an RJ-45 connector and converts the signal back into its high resolution video and serial data components. The receiver outputs the video on a 15-pin HD connector. The serial communications are passed on a 3.5 mm 3-pin captive screw connector.

The RS-232 portion of the twisted pair link:

- Can be bidirectional in a one-receiver system; that is, the receiver can receive commands from the transmitter and pass RS-232 responses to the transmitter.

NOTE: By default, the RS-232 portion of the twisted pair link is unidirectional only from the transmitter to the receiver. Use the internal jumpers in the receiver to enable bidirectional communication in a **single-receiver system only** (see "**Pre-Installation — RS-232 Jumper**" on page 5).

- Supports software flow control (XON, XOFF).

NOTE: Hardware flow control is not supported.

- Supports full duplex and half duplex operation.
- Supports any baud rate (up to 38,400), data bits, parity, stop bits, and data format without configuration.

NOTE: Higher rates are possible, but performance will vary as a function of baud rate and twisted pair cable length.

The receiver also buffers the proprietary input signal and sends it to another compatible MTP receiver or to a daisy chain of receivers.

NOTES:

- The transmitter provides pre-peaking, which boosts the signal before it is transmitted. The buffered output on the receiver does not provide any pre-peaking control. The total recommended distance (see the **table** on page 4) for an entire daisy chain is the same as for a single transmitter and receiver. The Pre-Peak switch on the transmitter has the same effect on the recommended transmission distance for a daisy chain as for a single transmitter and receiver.
- Up to eight receivers can be connected in series using the Buffered Output connectors, provided that the total distance from the twisted pair output of the transmitter to the last receiver in the chain does not exceed the recommended distance for the resolution being used.

The SEQ receiver also corrects the skew delay commonly encountered when CAT 5, 5e, or 6 cables are used for RGB video, component video, and S-video transmission.

NOTE: An SEQ receiver should not be necessary when Extron Enhanced Skew-Free AV UTP cable is used.

Each MTP transmitter and receiver model is shipped with an external desktop 12 VDC power supply that accepts 100 VAC to 240 VAC, 50-60 Hz input.

Twisted Pair Cable Advantages

Twisted pair cable is smaller, lighter, more flexible, and less expensive than coaxial cable. Termination of the cable with RJ-45 connectors is simple, quick, and economical.

Transmission Distance

The maximum distance is determined by the frequency and resolution of the signal that is input to the transmitter. The **table** on page **4** specifies the recommended maximum transmission distances and transmitter Pre-Peak switch positions (see **item ⑤** on page **9**) using Extron Enhanced Skew-Free AV UTP cable or CAT 5, 5e, or 6 cable, terminated with RJ-45 connectors.

NOTES:

- The transmitter and receiver are designed for and perform best with Extron Enhanced Skew-Free AV UTP cable terminated in accordance with the TIA/EIA T 568 A wiring standard. CAT 5, 5e, and 6 cables are acceptable, but less preferable. We also recommend the use of pre-terminated and tested cables. Cables terminated on site should be tested before use to ensure that they comply with Category 5 specifications.
- The recommendations shown in the **table** on page **4** apply for a single transmitter and receiver and for a daisy chain. For example, the maximum suggested range for 1024 x 768 video is 300 feet (90 m) with the Pre-Peak switch off and 500 feet (150 m) with the Pre-Peak switch on, whether the system consists of one transmitter and one receiver or a transmitter and three daisy-chained receivers.
- Extron recommends using at least 25 feet of twisted pair cable between the transmitter and the first receiver.
- For daisy-chained units, the first receiver in the chain must be at least 100 feet (30 m) from the transmitter when the Pre-Peak switch is on.
- For daisy-chained units, any receiver in the chain closer than 350 feet (105 m) may experience some form of over-peaking when the Pre-Peak switch is on. An overpeaked image may appear bloomed.

Video Format	Pre-Peak off	Pre-Peak on	Max. distance (high quality)	Max. distance (variable quality)
Composite, S-video, Component			800' (245 m)	1000' (300 m)
640 x 480	<300' (90 m)	>350' (105 m)	700' (215 m)	750' (240 m)
800 x 600	<300' (90 m)	>350' (105 m)	550' (165 m)	650' (200 m)
1024 x 768*	<300' (90 m)	>350' (105 m)	500' (150 m)	600' (185 m)
1280 x 960*	<300' (90 m)	>350' (105 m)	400' (120 m)	500' (150 m)
1280 x 1024*	<250' (75 m)	>300' (90 m)	350' (105 m)	450' (135 m)
1360 x 765	<250' (75 m)	>300' (90 m)	400' (120 m)	500' (150 m)
1365 x 768	<250' (75 m)	>300' (90 m)	400' (120 m)	450' (135 m)
1366 x 768	<250' (75 m)	>300' (90 m)	400' (120 m)	450' (135 m)
1400 x 1050	<250' (75 m)	>300' (90 m)	350' (105 m)	400' (120 m)
1440 x 900	<250' (75 m)	>300' (90 m)	350' (105 m)	400' (120 m)
1600 x 1200*	<250' (75 m)	>300' (90 m)	300' (90 m)	450' (135 m)
1920 x 1200	<250' (75 m)	>300' (90 m)	300' (90 m)	400' (120 m)
2048 x 1080	<250' (75 m)	>300' (90 m)	300' (90 m)	400' (120 m)
HDTV 720p	<250' (75 m)	>300' (90 m)	400' (120 m)	500' (150 m)
HDTV 1080i	<250' (75 m)	>300' (90 m)	300' (90 m)	400' (120 m)
HDTV 1080p	<250' (75 m)	>300' (90 m)	300' (90 m)	400' (120 m)

Figure 1. Recommended Pre-Peak Switch Positions and Transmission Distances at 60 Hz

NOTES:

- Resolutions marked with an asterisk (*) in the table above have the same range specifications at 75 Hz.
- It is possible to exceed the recommended distance; however, image quality may be reduced.

Installation and Operation

This section provides information on:

- [Installation and Operation Overview](#)
- [Front Panel Features](#)
- [Transmitter Rear Panel Features](#)
- [Receiver Rear Panel Features](#)

Installation and Operation Overview

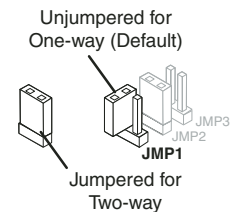
Follow the steps below to properly install and operate any of the Extron MTP 15HD RS transmitters and receivers.

ATTENTION: Potential damage to property.

Do not connect these devices to a computer data or telecommunications network.

Pre-Installation — RS-232 Jumper

The RS-232 circuits of the receiver are factory-set to be one-way, transmitter to receiver. If the system has only one receiver, jumper JMP 1 on the main board can be set for two-way communication as shown in the figure to the right.



Installation

1. Turn off all MTPs and devices. Make sure that the input sources, the MTP, and the output sources are all turned off and all power sources and signal cables are disconnected.
2. Connect the transmitter inputs (see "[Transmitter Rear Panel Features](#)" on page [8](#)).
3. Connect twisted pair (TP) cables between the MTP units (see "[Transmitter Rear Panel Features](#)" on page [8](#) and "[Receiver Rear Panel Features](#)" on page [10](#)).
4. Connect the receiver outputs (see "[Receiver Rear Panel Features](#)" on page [10](#)).
5. Configure the receiver DIP switches (see "[Receiver Panel Features](#)" on page [10](#)).
6. Configure the EDID (see "[Front Panel Features](#)" on page [6](#) and "[EDID Configuration](#)" on page [15](#)).
7. Connect the power supply and turn on all devices (see "[Power Supply Wiring](#)" on page [12](#)).
8. Adjust the level and peaking (see "[Front Panel Features](#)" on page [6](#)).
9. Adjust the skew delay control (see "[Front Panel Features](#)" on page [6](#)).
10. If applicable, mount the MTPs (see "[Mounting](#)" on page [18](#)).

Front Panel Features

See figure 2 below to identify the front panel features on the transmitter and receiver.

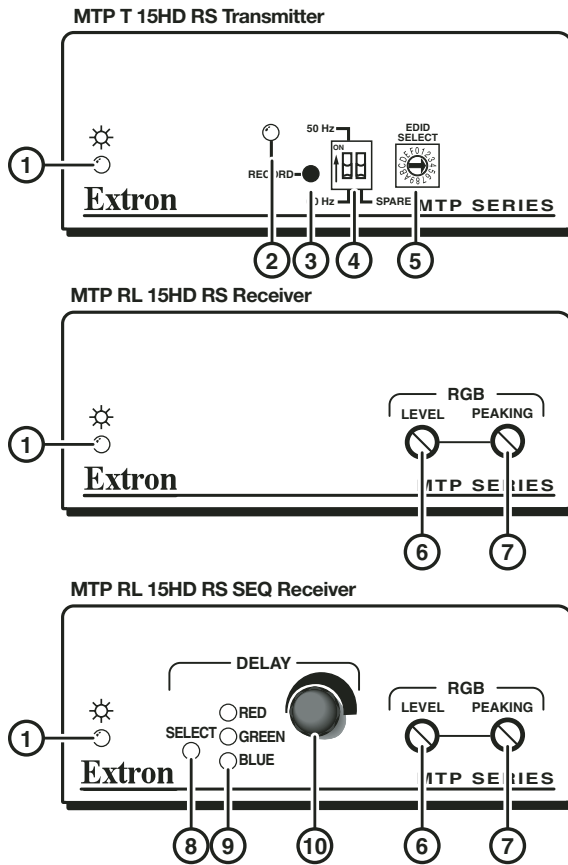


Figure 2. MTP Front Panels

NOTE: Control signal ground pins may be labeled as \perp or "G". Audio ground pins may be labeled as \perp or \downarrow . The wiring and function are the same, whichever way your product is labeled.

- ① **Power LED** — The LED indicator lights when the unit is receiving power.
- ② **Record LED** — The LED indicator flashes red during the EDID recording process to indicate a new EDID being written to memory. The LED returns to a solid green after the write completes.
- ③ **Record button** — The recessed record button is used to initiate recording of the EDID of a display device (connected to the loop-out) to user-programmable memory position 0 on the rotary switch (⑤).
- ④ **Vertical frequency DIP switch** — The first DIP switch selects the vertical frequency for the pre-programmed EDID. When switched to OFF (default position), the EDID selected by the rotary positions 1 through E are based on 60 Hz. When switched to ON, they are based on 50 Hz. The second DIP switch, marked SPARE, is not used.

NOTE: When the EDID select rotary switch (⑤) is in position 0 or F, the setting of the first DIP switch is not applicable because the user-recorded or attached display EDID is being used.

- ⑤ **EDID select rotary switch** — The rotary switch is used to select specific pre-programmed or user-recorded EDID settings. Position 0 of this 16 position rotary switch is used to select the user recorded EDID. Position F passes the EDID from the display connected to the loop-out back to the input. Positions 1 through E select pre-programmed EDID resolutions.

NOTE: The refresh rate of the pre-programmed EDID resolutions is selected using the first DIP switch (④).

- ⑥ **Level control** — The level control alters the video output voltage to affect the brightness of the displayed image. Adjust the knob while viewing the displayed image to set the level that provides the best picture quality.

NOTE: For best results when using an RL receiver, connect a load to the buffered output on the receiver before adjusting the level.

- ⑦ **Peaking control** — Peaking affects the sharpness of a picture. Increased peaking can compensate for mid and high frequency detail loss from low bandwidth system components or capacitance in long cables. The minimum setting (at the counterclockwise limit) provides no peaking. The maximum setting (at the clockwise limit) provides 100% peaking. Adjust this control to obtain the optimum picture sharpness.

- ⑧ **Select button (SEQ model only)** — This recessed button selects the Red, Green, or Blue video signal to adjust and resets all three video signals to a skew delay of zero nanoseconds.

Use a small screwdriver to press and release this button to cycle among selecting the Red, Green, or Blue video signal to adjust. The selected signal is indicated by the Red, Green, and Blue LEDs (⑨).

NOTE: The SEQ receiver automatically saves the setting for the video signal that is being deselected when you push this button or when the selection times out after 10 seconds.

Press and hold this button for approximately 3 seconds to set the skew delay for Red, Green, and Blue to zero. The Red, Green, and Blue LEDs (⑨) all turn off. Release the button.

- ⑨ **Red, Green, and Blue LEDs (SEQ model only)** — These LEDs indicate the video signal that is selected by the Select button (⑧) for skew adjustment using the Delay control (⑩). The LED of the selected color flashes when skew compensation for the selected video signal has reached the minimum or maximum limit.

- ⑩ **Delay (skew adjustment) control (SEQ model only)** — This control delays the selected Red, Green, or Blue video signal by up to 62 nanoseconds. The delay is applied in incremental, 2-nanosecond steps. Rotate the control counterclockwise to reduce the delay or clockwise to increase the delay.

NOTES:

- The control turns smoothly; it does not have mechanical steps or high and low limit stops.
- Watch the displayed image to observe the steps of delay.
- The selected Red, Green, or Blue LED (⑨) flashes to indicate that the control has reached the minimum (counterclockwise rotation) or maximum (clockwise rotation) limit.

Transmitter Rear Panel Features

Figure 3 shows an MTP T 15HD RS transmitter, which has all of the connectors and other features that are on either transmitter in the MTP 15HD RS series.

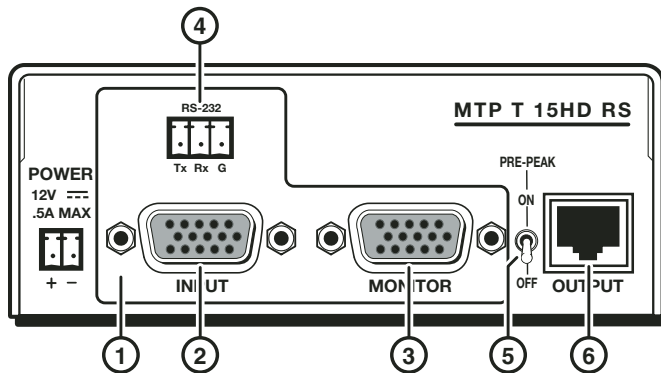


Figure 3. Transmitter Rear Panel

- ① **Power connector** — Plug the included external 12 VDC power supply into this 2-pole captive screw connector. See "**Power Supply Wiring**" on page 12 to wire the connector.
- ② **Input video connector** — Connect a computer video source to this 15-pin HD connector for high resolution video input (see figure 4).

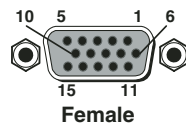


Figure 4. 15-pin HD Connector

NOTES:

- Input only sync signals (no video signals) on the sync pins (13 and 14).
- For component video, use the R (R-Y) and R return pins (pins 1 and 6), G (Y) and G return pins (pins 2 and 7), and B (B-Y) and B return pins (pins 3 and 8). For S-video, use the R, R return (C-chroma), G, and G return (Y-luma) pins.
- For composite video, use the G pin and the associated return pin. For additional genlocked video signals, use the R, B, and associated return pins.

- ③ **Monitor connector** — Connect a video monitor to this 15-pin HD connector for buffered, high resolution video loop-through.
- ④ **RS-232 connector** — Connect a serial communications port to this 3.5 mm, 3-pole captive screw connector for bidirectional RS-232 communication. Wire the connector as shown in figure 5.

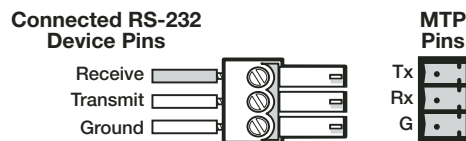


Figure 5. RS-232 Connector Wiring

- ⑤ **Pre-Peak switch** — The Pre-Peak switch alters the twisted pair signal output to correct for long cable runs. See the **table** on page **4** for suggested switch settings based on the transmitted video format and transmission distance.

NOTES:

- Use the internal jumpers to enable bidirectional communication (see "**Pre-Installation — RS-232 Jumper**" on page **5**).
- The length of the exposed wires in the stripping process is critical. The ideal length is 3/16 inches (5 mm). If the exposed section is longer, the exposed wires may touch, causing a short circuit between them. If it is shorter, the wires can be easily pulled out, even if tightly fastened by the captive screws.
- Do not tin the wires. Tinned wire does not hold its shape and can become loose over time.

- ⑥ **Output connector** — Connect one end of a twisted pair cable to this RJ-45 female connector on the transmitter. Connect the free end of the same twisted pair cable to the RJ-45 female connector on the receiver. See "**Twisted Pair Cable Termination**" on page **13** to wire the RJ-45 connectors.

ATTENTION: Potential damage to property.

Do not connect these devices to a computer data or telecommunications network.

Receiver Rear Panel Features

Figure 6 shows an MTP RL 15HD RS receiver, which has all of the connectors and other features that are on either receiver in the MTP 15HD RS series.

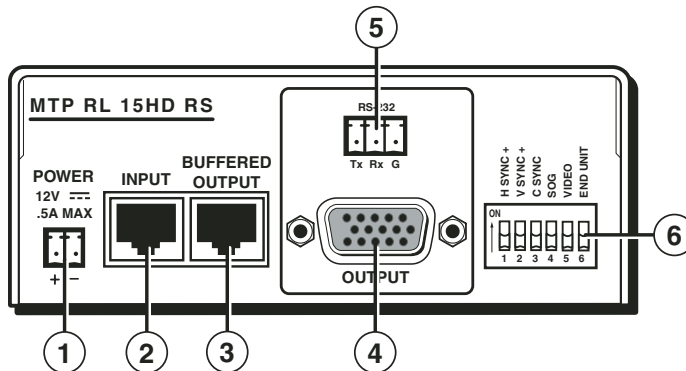


Figure 6. Receiver Rear Panel

- ① **Power connector** — Plug the included external 12 VDC power supply into this 2-pole captive screw connector. Wire the connector as shown in [figure 8](#) on page [12](#).

ATTENTION: Potential damage to property.

Before wiring the connector, read the notes, attentions, and warnings in the "[Power Supply Wiring](#)" section on page [12](#).

- ② **Input connector** — Connect one end of the twisted pair cable from the transmitter or from the buffered output connector of an RL receiver to this RJ-45 female connector.
- ③ **Buffered output connector** — Connect one end of a twisted pair cable to this female RJ-45 connector. Connect the free end of the same TP cable from the receiver to the Input RJ-45 female connector on another receiver. See "[Twisted Pair Cable Termination](#)" on page [13](#) to wire the RJ-45 connectors.

ATTENTION: Potential damage to property.

Do not connect these devices to a computer data or telecommunications network.

NOTES:

- The non-C7 transmitters and receivers will not work properly with STP201 or CAT 7 STP cable.
- The C7 transmitters and receivers will work properly only with STP201 or CAT 7 STP cable.

- ④ **Output video connector** — Connect a projector or other high resolution video device to this 15-pin HD connector.
- ⑤ **RS-232 connector** — Connect a serial communications port to this 3.5 mm, 3-pole captive screw connector for bidirectional RS-232 communication. Wire the connector as shown in [figure 5](#) on page [8](#).

NOTE: See ④ on page [8](#) before wiring the connector.

⑥ **DIP switches (RL receivers only)** — A 6-pole DIP switch is used to configure the features of the MTP receivers.

- **Horizontal sync (H Sync +) switch** — Set this switch On (up) for positive horizontal sync or Off (down) for negative sync.
- **Vertical sync (V Sync +) switch** — Set this switch On (up) for positive vertical sync or Off (down) for negative sync.

NOTE: For H Sync + and V Sync +, most devices use negative sync.

- **Composite Sync (C Sync) switch** — Set this switch up for RGBS or down to output RGBHV or RGSB video (see figure 7).

Input signal format to the transmitter	Output signal format from the receiver	Receiver DIP switch settings		
		C Sync	SOG	Video
RGBHV	RGBHV			
	RGBS			
	RGSB			
RGBS	RGBS			
	RGSB			
RsGsBs	RsGsBs			
RGSB	RGSB			
Component	Component			
S-video	S-video			
Composite	Composite			

Figure 7. Receiver DIP Switch Settings

- **Sync-on-Green (SOG) switch** — Set this switch up for RGSB video (when the input is RGBHV or RGBS) or down to output RGBHV, RsGsBs, or RGBS video (see figure 7).
- **Video switch** — Set this switch up for RsGsBs, RGSB, component video / S-video / composite video or down to output RGBHV or RGBS video (see figure 7).

NOTE: Set the Composite Sync, SOG, and Video DIP switches as shown in figure 7 for the various input and output video formats

- **End Unit switch** — Set this switch On (up) if either of the following is true:
 - The receiver being configured is the only receiver connected to the transmitter.
 - The receiver being configured is the last receiver in a daisy-chained system.

Set the End Unit switch Off (down) on the receiver being configured if there are one or more receivers connected to the Buffered Output RJ-45 connector.

Power Supply Wiring

Figure 8 below shows how to wire the connector.

ATTENTION:

- **Potential damage to property.**
Power supply voltage polarity is critical. Incorrect voltage polarity can damage the power supply and the transmitter or receiver. Identify the power cord negative lead by the ridges on the side of the cord.
- The length of the exposed (stripped) copper wires is important. The ideal length is 3/16 inches (5 mm). Longer bare wires can short together. Shorter wires are not as secure in the connector and could be pulled out.

To verify the polarity before connection, plug in the power supply with no load and check the output with a voltmeter.

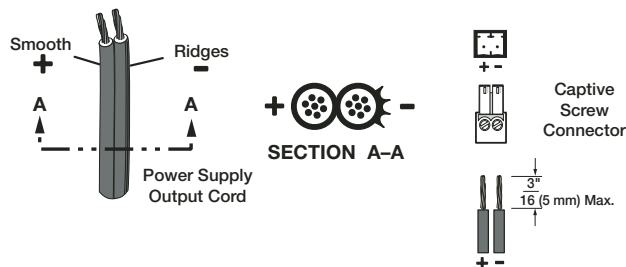


Figure 8. Power Connector Wiring

WARNING: Failure to follow these instructions may result in serious injury.

The two power cord wires must be kept separate while the power supply is plugged in. Disconnect the power before wiring.

NOTES:

- Your transmitter/receiver pair may have shipped with a blue captive screw connector. This blue connector can be plugged into either a blue or an orange power receptacle. The blue connector does not have the extended tail or the included tie-wrap.
- Do not tin the power supply leads before installing in the direct insertion connector. Tinned wires are not as secure in the connectors and could be pulled out of the connector.

ATTENTION:

- **Potential damage to property.**
This product is intended to be supplied by a Listed Power Unit marked "Class 2" or "LPS", rated 12 VDC, maximum 1.0 A. Always use a power supply supplied or specified by Extron. Use of an unauthorized power supply voids all regulatory compliance certification and may cause damage to the supply and the end product.
- The installation must always be in accordance with the applicable provisions of National Electrical Code ANSI/NFPA 70, article 75, and the Canadian Electrical Code part 1, section 16. The power supply shall not be permanently fixed to building structure or similar structure.
- Unless otherwise stated, the AC/DC adapters are not suitable for use in air handling spaces or in wall cavities. The power supply is to be located within the same vicinity as the Extron AV processing equipment in an ordinary location, Pollution Degree 2, secured to the equipment rack within the dedicated closet, podium, or desk.

As an alternative, an Extron PS 124 Universal 12 VDC Power Supply (part number **60-1022-01**) can power multiple MTPs or other Extron 12 VDC devices using only one AC power connector.

Twisted Pair Cable Termination

Figure 9 details the recommended termination of twisted pair cables with RJ-45 connectors in accordance with the TIA/EIA T568A or TIA/EIA T568B wiring standards. You can use either standard with CAT 5, 5e, and 6 cable, but ensure that you **use the same standard on both ends of the cable**.

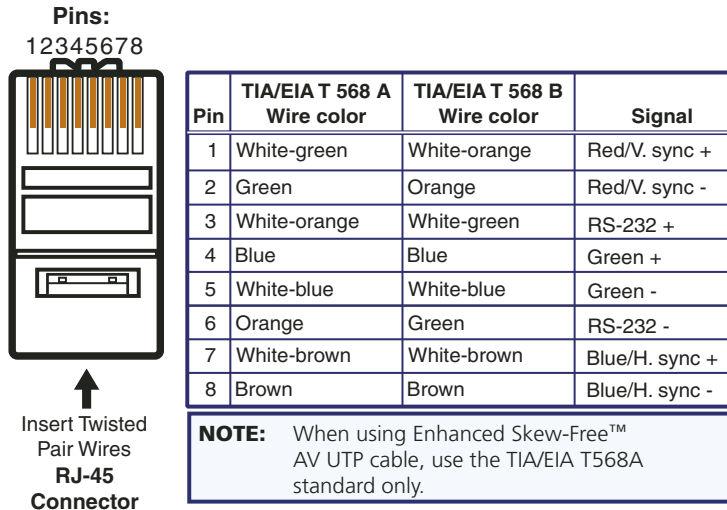


Figure 9. Twisted Pair Cable Termination Diagram

NOTES:

- RJ-45 termination with CAT 5, 5e, or 6 cable must comply with the TIA/EIA T568A or TIA/EIA T568B wiring standards for all connections.
- RJ-45 termination with Skew-Free AV UTP cable must comply with TIA/EIA T568A only.
- For proper grounding of **shielded twisted pair cable**, ensure the shield around each wire pair are all tied to the RJ-45 connectors on both ends, in accordance with the connector specifications provided by the manufacturer.
- Extron Enhanced Skew-Free AV cable is not recommended for Ethernet/LAN applications. This cable is specially designed for compatibility with Extron Twisted Pair products that are wired using the TIA/EIA T568A standard.
- The green, brown, and blue wire pairs of this cable have virtually identical lengths and should be used to transmit the RGB signals.
- The orange wire pair of this cable has a different length and **should not** be used to transmit the RGB signals.

Skew Delay Compensation

CAT 5, 5e, and 6 cable can lead to registration errors between the Red, Green, and Blue video signals. Pair skew can be measured with test equipment or identified by viewing a crosshatch test pattern with a critical eye to determine if either the Red, Green, or Blue video image leads (appears to the left of) the other two video images.

NOTE: Unless the twisted pair cable is changed, the skew adjustment should need to be made only once, during installation.

SEQ Receiver Skew Compensation

The SEQ receiver has built-in skew compensation capabilities.

Adjust the equalization as follows:

- 1. Zero the skew delay** for Red, Green, and Blue as follows:
 - a.** Use a small screwdriver to press and **hold** the Select button for three seconds. The Red, Green, and Blue LEDs all go out.
 - b.** Release the Select button.
- 2.** Use UTP cable test equipment or examine the displayed video image with a critical eye to **determine which video signal** — Red, Green, or Blue — **is most shifted to the left.**

NOTE: A crosshatch test pattern or a black background with vertical white lines is ideal for determining skew.

- 3.** Adjust the leftmost video signal as follows:

NOTE: The SEQ receiver cannot shift the rightmost video image to the left.

- a.** Use a small screwdriver to press and release the Select button until the LED lights for the left-shifted color — Red, Green, or Blue.
- b. Slowly** rotate the Delay control clockwise while monitoring the display. Observe that the leftmost color shifts rightward one step at a time. Continue to rotate the control until that color is properly converged.

NOTE: A 2-nanosecond adjustment is very fine. Up to 10 nanoseconds of delay may be necessary before you detect a change in the display.

- c.** Use a small screwdriver to press the Select button one more time to save the most recent adjustment or allow the 10-second time-out to elapse.
- 4.** If the remaining colors are left shifted, repeat steps **2** and **3**.

Non-SEQ Receiver Skew Compensation

Try using the following methods to minimize or eliminate pair skew:

- Switch to Extron Enhanced Skew-Free AV UTP cable.
- Add a skew compensation cable equal to the length of pair skew to the output of the receiver.
- Install an SEQ 100 15HD Skew Equalizer to the video output of the receiver and adjust the skew for the leading video image.

EDID Configuration

The MTP 15HD RS transmitter can either record EDID from a display device, or a pre-programmed EDID can be selected using the rotary and DIP switches.

Recording a Display EDID

1. Turn the rotary switch to position 0.

NOTE: The vertical frequency DIP switch has no effect in this mode.

2. Connect the display device to the local monitor output connector.

NOTE: The MTP 15HD transmitter should be supplying the necessary 5 VDC to power on the display. However, to ensure that EDID is being transmitted, power on the display.

3. When ready to record to memory, press and release the recessed record button (see ③ on **figure 2** on page 6) to begin the recording process. The Record LED (see ② on **figure 2** on page 6) will flash red rapidly during recording, then return to solid green after recording is completed. At this time, the display can be disconnected. Connect the source device to the input connector.
4. Power on or restart the source device if necessary.

Using a Pre-Programmed or User-Recorded EDID

1. If you have not already done so, connect the source device to the MTP 15HD transmitter. Do not power on the source device at this time.
2. Set the front panel DIP switch (see ④ on **figure 2** on page 6) to the required frequency (50 or 60 Hz).
3. Set the rotary dial (see ⑤ on **figure 2** on page 6) to the required position (see the table in **figure 12**). Positions 1 through E are factory installed. Position 0 is for user-recorded EDID information. Position F passes the EDID from the display connected to the loop-out directly back to the input.

Rotary Switch Position	Resolution
0	User-recorded EDID
1	800x600
2	1024x768 (default)
3	1280x720
4	1280x768
5	1280x800
6	1280x1024
7	1360x768
8	1366x768
9	1400x1050
A	1400x900
B	1600x1200
C	1680x1050
D	1920x1080
E	1920x1200
F	Local monitor pass-through

Figure 12. EDID Settings Table

Reference Information

This section provides information about:

- [Part Number, Optional Accessories, Cables, and Connectors](#)

Part Numbers, Optional Accessories, Cables, and Connectors

Part Numbers

MTP Transmitter and Receivers	Part Number
MTP T 15HD RS transmitter	60-1281-01
<i>or</i> MTP RL 15HD RS receiver	60-735-01
<i>or</i> MTP RL 15HD RS SEQ receiver	60-735-02

Included Parts	Part Number
12 VDC 1.0 A desktop power supply	28-071-57LF
IEC power cord	27-044-01
3-pole captive screw connector	10-703-12LF
(4) Rubber feet (not attached)	
Tweezer	
Setup Guide — MTP 15HD RS Series	

Optional Accessories

Description	Part Number
PS 124 multiple output 12 volt DC power supply	60-1022-01
MBB 100 (1/8 and 1/4 back of rack mounting kit)	70-367-01
MBU 123 under desk mounting kit	70-212-01
PMK 100 (1/4 rack width pole mount kit)	70-217-01
RSF 123 (3.5 inches deep, 1U rack shelf kit)	60-190-20
RSB 123 (3.5 inches deep, 1U basic rack shelf)	60-604-21
RSU 126 (6 inches deep, 1U rack shelf kit)	60-190-10
RSB 126 (6 inches deep, 1U basic rack shelf)	60-604-11
RSU 129 (9.5 inches deep, 1U rack shelf kit)	60-190-01
RSB 129 (9.5 inches deep, 1U basic rack shelf)	60-604-02

Cables

NOTE: Extron Enhanced Skew-Free AV UTP cables are not recommended for Ethernet or LAN applications.

Description	Part Number
VGA connector cable	26-238-xx
SYM BNC Female Mini High Resolution cable	21-251-xx
Extron Enhanced Skew-Free AV UTP cable (cut, various lengths)	26-569-xx
Extron Enhanced Skew-Free AV UTP cable 1000' (bulk) (Non-Plenum)	22-141-03
Extron Enhanced Skew-Free AV UTP cable 1000' (bulk) (Plenum)	22-142-03

Connectors

RJ-45 Connectors	Part Number
CAT 6 jack (Black), quantity 10	100-476-01
CAT 6 jack (Red), quantity 10	100-477-01
CAT 6 jack (Blue), quantity 10	100-478-01
CAT 6 jack (Orange), quantity 10	100-479-01
CAT 6 jack (Gray), quantity 10	100-480-01
CAT 6 jack (White), quantity 10	100-481-01
CAT 6 jack (Ivory), quantity 10	100-482-01

Mounting

This section outlines the various mounting options available for the MTP 15HD RS Series transmitters and receivers:

- **Tabletop Placement**
- **Under-Desk and Furniture Mounting**
- **Rack Mounting**
- **Projector Mounting**

Tabletop Placement

Attach the four provided rubber feet to the bottom of the unit and place it in any convenient location.

Under Desk and Furniture Mounting

Mount the unit under a desk or podium using the optional Extron MBU 123 under desk mounting kit (part number **70-212-01**). To mount the unit, follow the instructions provided with the MBU 123 kit.

Rack Mounting

UL Guidelines for Rack Mounting

The following Underwriters Laboratories (UL) guidelines are relevant to the safe installation of these products in a rack:

- 1. Elevated operating ambient temperature** — If the unit is installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, install the equipment in an environment compatible with the maximum ambient temperature (TMA = +122 °F, +50 °C) specified by Extron.
- 2. Reduced air flow** — Install the equipment in the rack so that safe operation and adequate air flow is provided to the unit.
- 3. Mechanical loading** — Mount the equipment in the rack so that a hazardous condition is not achieved due to uneven mechanical loading.
- 4. Circuit overloading** — Connect the equipment to the supply circuit and consider the effect that circuit overloading might have on overcurrent protection and supply wiring. Consider the equipment nameplate ratings when addressing this concern.
- 5. Reliable earthing (grounding)** — Maintain reliable grounding of rack-mounted equipment. Pay particular attention to supply connections other than direct connections to the branch circuit (such as the use of power strips).

Rack Mounting Procedure

These units can be mounted on any of these optional rack systems, including:

- **RSF 123:** 3.5 inch deep, 1U rack shelf kit (part number **60-190-20**)
- **RSB 123:** 3.5 inch deep, 1U basic rack shelf (part number **60-604-21**)
- **RSU 126:** 6 inch deep, 1U rack shelf kit (part number **60-190-10**)
- **RSB 126:** 6 inch deep, 1U basic rack shelf (part number **60-604-11**)
- **RSU 129:** 9.5 inch deep, 1U rack shelf kit (part number **60-190-01**)
- **RSB 129:** 9.5 inch deep, 1U basic rack shelf (part number **60-604-02**)

To mount the unit on a rack shelf, follow the instructions provided with the shelf accessories.

Back of the Rack Mounting Procedure

The MTP can be mounted to the rear of a rack using the Extron MBB 100 1/8 and 1/4 back of rack mounting kit (part number **70-367-01**). The kit allows the product to be vertically mounted to the front or rear rack supports and facing either towards the front or the rear of the rack.

To mount the unit, follow the instructions provided with the MBB 100 kit.

Projector Mounting

Mount the unit onto a projector using the optional Extron PMK 100 1/4 rack width pole mount kit (part number **70-217-01**). To mount the unit, follow the instructions provided with the PMK 100 kit.

Extron Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

USA, Canada, South America, and Central America:

Extron Electronics
1001 East Ball Road
Anaheim, CA 92805
U.S.A.

Japan:

Extron Electronics, Japan
Kyodo Building, 16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

Europe and Africa:

Extron Europe
Hanzeboulevard 10
3825 PH Amersfoort
The Netherlands

China:

Extron China
686 Ronghua Road
Songjiang District
Shanghai 201611
China

Asia:

Extron Asia
135 Joo Seng Road, #04-01
PM Industrial Bldg.
Singapore 368363
Singapore

Middle East:

Extron Middle East
Dubai Airport Free Zone
F12, PO Box 293666
United Arab Emirates, Dubai

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions, or if modifications were made to the product that were not authorized by Extron.

NOTE: If a product is defective, please call Extron and ask for an Application Engineer to receive an RA (Return Authorization) number. This will begin the repair process.

USA: 714.491.1500 or 800.633.9876

Europe: 31.33.453.4040

Asia: 65.6383.4400

Japan: 81.3.3511.7655

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.

Extron Headquarters +1.800.633.9876 (Inside USA/Canada Only) Extron USA - West +1.714.491.1500 +1.714.491.1517 FAX	Extron USA - East +1.919.850.1000 +1.919.850.1001 FAX	Extron Europe +800.3987.6673 (Inside Europe Only) +31.33.453.4040 +31.33.453.4050 FAX	Extron Asia +800.7339.8766 (Inside Asia Only) +65.6383.4400 +65.6383.4664 FAX	Extron Japan +81.3.3511.7655 +81.3.3511.7656 FAX	Extron China +4000.398766 Inside China Only +86.21.3760.1568 +86.21.3760.1566 FAX	Extron Middle East +971.4.2991800 +971.4.2991880 FAX	Extron Korea +82.2.3444.1571 +82.2.3444.1575 FAX	Extron India 1800.3070.3777 Inside India Only +91.80.3055.3777 +91.80.3055.3737 FAX
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